

ABSTRACT OF THE DISCLOSURE

With a view to preventing the oxidation of a metal film at the time of light oxidation treatment after gate patterning and at the same time to making it possible to control the reproducibility of oxide film formation and homogeneity of oxide film thickness at gate side-wall end portions, in a gate processing step using a poly-metal, a gate electrode is formed by patterning a gate electrode material which has been deposited over a semiconductor wafer 1A having a gate oxide film formed thereon and has a poly-metal structure and then, the principal surface of the semiconductor wafer 1A heated to a predetermined temperature or vicinity thereof is supplied with a hydrogen gas which contains water at a low concentration, the water having been formed from hydrogen and oxygen by a catalytic action, to selectively oxidize the principal surface of the semiconductor wafer 1A, whereby the profile of the side-wall end portions of the gate electrode is improved.

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